REMARKS

1. Disposition of Claims

Claims 1, 3-14, and 16-20 are currently pending. Claim 1 has been amended to combine it with Claim 2. In addition, Claim 1 has been amended by indicating that the fabric in the composite is a non-woven laid fabric. Basis for this amendment can be found in the specification as filed, e.g. in [0065] and [0112] to [00117], [0119] and e.g. in Figures 11-13, 16-19. In addition, the insulating layer is recited to be adapted to spatially separate the fabric from the matrix. Basis for this amendment can be found in the specification as filed, e.g. in [0056]. There is further basis form the term "within said layer" introduced in Claim 1, e.g. in the specification in [0061].

2. Novelty

The Examiner has rejected Claims 1-8, 10-14 , 17 and 20 under 35 USC 102 (b) as anticipated by or, in the alternative, under 35 USC 103(a) as obvious over Bourgois (US 5,883,018). Amended Claim 1 of the present invention recites a composite that comprises a matrix, an intermediate insulating layer, and a reinforced fabric. The fabric of the present invention is not a woven fabric but a laid fabric. It consists of at least two layers of (metal or steel reinforced) individual elements. All layers in the fabric are superimposed onto each other. These layers of individual elements are connected with each other by a connection that is weaker than the reinforcement element in said layers. The layers of individual elements are arranged under an angle with respect to each other which is between 1 and 89°.

Bourgois (US 5,883,018) discloses a *woven* fabric comprising a plurality of steel cords. The fabric may be used as an insert in textiles. Fig. 10 of Bourgois shows a fabric which consists of a solid *woven* structure having two layers of steel cord as warp, and three layers of synthetic filaments or steel cords as weft. The warp and weft layers are bound by means of nylon filaments.

In column 6, line 10-17 of Bourgois, a textile (composite) is disclosed, in which three different fabrics, each comprising a layer of reinforcement elements with a different orientation, can build a well known triangular structure. Such disclosure thus teaches a composite comprising three *woven* fabrics that have been superimposed onto each other under angles of 60°. It is noted that Burgois further states that three three layers can be woven together. In contrast, in the present

invention, the composite comprises one non-woven fabric, of which the layers have been superimposed onto each other under angles of between 1-89°.

The fabric of the present invention differs from the fabric disclosed in Bourgois differs in that it is a non-woven fabric. Bourgois teaches woven structures (see for instance FIG. 5 to 10), as also further explained in the description on column 3, lines 19-23 and column 5, lines 11-12 and lines 32-37.

In contrast, the present fabric is a non-woven, laid fabric. The claimed invention provides superposition of individual layers of elements *within* one *non-woven fabric* in different angles. The individual elements (and thus the layers of elements) are not interwoven. The different layers are connected with each other by a connection that is weaker than the reinforcement element in said layers. Such weak type of connection is also not disclosed in Bourgois.

In view of the above, Bourgois does not teach each element of the claims and therefore cannot anticipate the claims. The rejection should be withdrawn.

3. Non-Obviousness

Bourgois alone

The Examiner has rejected Claim 18 under 35 USC 103(a) as being obvious over Bourgois. Claim 18 incorporates all the limitations of Claim 1, from which it depends. In order to support of finding of obviousness over a single reference, any differences between that reference and the claimed invention must be obvious to those having ordinary skill in the art. As discussed above, Burgois does not teach all of the limitations of Claim 1. The Examiner has made no findings that would support an allegation that the differences between the present invention and the Bourgois reference noted above would be obvious to one having ordinary skill in the art. Accordingly, no *prima facie* showing of obviousness has been established with regard to Claim 1 or 18. As such, the rejection of Claim 18 should be withdrawn.

Bourgois in view of VanderWerf

The Examiner has rejected Claims 9 and 16 under 35 USC 103(a) as being obvious over Bourgois in further view of VanderWerf (US 6,517,659). In order to establish a *prima facie* case of obviousness, the combined references must teach each element of the claim. The Examiner has cited VanderWerf because Bourgois does not teach the specific protective textile materials recited by Claims 9 and 16. VanderWerf teaches the use of *woven* polyester fibers. Therefore, neither VanderWerf nor Bourgois teach how to modify the teaching of Bourgois to address all of

the elements of Claim 1, as discussed above. Therefore, a *prima facie* case of obviousness has not been established with regard to Claims 9 and 16, which include all the limitations of Claim 1.

Bourgois and Applicants' Alleged "Admission"

The Examiner has rejected Claim 19 under 35 USC 103 as being obvious in over Bourgois in view of an alleged "Applicant's Admission of Prior Art". The alleged admission relates to providing joints or weakening points in steel fibers to enable folding thereof. This concept does not relate to how to modify the teaching of Bourgois to address all of the elements of Claim 1, as discussed above. Therefore, a *prima facie* case of obviousness has not been established with regard to Claim 19, which includes all of the limitations of Claim 1.

Bourgois in view of Lyons

The Examiner has rejected Claims 1-8, 10-14, 17-18 and 20 as being obvious over Bourgois in further view of Lyons (US 6,526,862). Lyons (US 6,526,862) discloses a garment comprising a filler. Said filler consists of multiple layers of woven fabrics that are arranged in a quasi-isotropic orientation. The woven fabrics are made of fibers such as PBO fibers, aramide fibers or PE fibers. The fibers are woven into a balanced plain weave fabric. Multiple layers of fabric are combined to create the ballistic filler material for the garment, and can be positioned with regard to each other under angles of 20-70°.

The present composite as claimed in claim 1 differs from the composite in Lyons in a number of different aspects, including in that:

- the claimed fabric comprises metal or steel reinforced individual elements. Lyons does not disclose such type of reinforcement elements, but refers to synthetic fibers as individual elements;
- the fabric of the claimed invention is a laid fabric and not a woven fabric;
- the individual elements in the fabrics of Lyons are interwoven, while the claimed individual elements are not interwoven;
- Lyons discloses a composite comprising *two or more woven* fabrics that have been superimposed onto each other under angles of 20-70° and not *one non woven* fabric, of which the layers have been superimposed onto each other; and
- Lyons does not disclose an insulating layer which is intermediate between the garment (matrix) and the filler (fabric).

The composite disclosed in Bourgois comprises a fabric which differs from the claimed fabric in that it is a woven fabric, while the present fabric is a laid fabric. Another difference is that Bourgois (inherently) discloses a composite comprising *woven* fabrics that have been superimposed onto each other under angles of 60° and not *non-woven* fabric, of which the layers have been superimposed onto each other under angles of between 1-89°. Thus, the combination of Bourgois with Lyon fails to teach or suggest every element recited in Claim 1.

The effect of the differences between the claimed invention and the prior art is that a composite material is obtained having improved cutting resistance. An objective problem of the present invention is therefore to provide a composite material which has improved cutting resistance. The solution to this problem is obtained by providing a composite having a matrix, provided on at least one side with a fabric comprising individual metal reinforcement elements, having at least one insulating layer interposed between said matrix and said fabric. The features particularly important for providing improved cutting resistance to the present composite include:

- the feature that a fabric is present in the composite which is a laid (i.e. a non-woven) fabric; and
- the feature that fabric has layers of reinforcement elements that are superimposed and arranged with respect to each other under an angle of between 1 and 89°; and
- the presence of an insulating layer.

The present invention comprises a fabric comprising a laid (i.e. a non-woven) fabric. In such fabrics the layers of reinforcement elements are superimposed onto each other. It is known in the art that non-woven fabrics are fabrics that are neither woven nor knitted. It is also known in the art that non-wovens are typically not strong, and do not stretch. Nevertheless, the applicants have adapted such non-woven fabrics in a composite material that improves cutting resistance. This is unexpected, as it is counterintuitive in light of the inherent properties of non woven fabrics. More in particular, a major advantage of the layers (elements) being simply superimposed onto each other under certain angles of between 1 and 89° is that the layers can easily move or slide when a cutter is brought into the composite. Different elements are then able to simultaneously undergo some displacement, when acting upon by a cutting element. As a consequence, individual elements will be less easily cut through, and cutting resistance of the

fabric and composite will be greatly improved. The present invention thus provides a composite having maximal cutting resistance, by enabling the anti-cutting reinforcement elements to act as free as possible, i.e. by creating "bundles" or "groups" of individual elements before a single element gets cut through. In addition, the applicant submits that good cutting resistance is obtained even if the reinforcement elements in the fabric are not interwoven. Moreover, improved cutting resistance can be assigned to the specific superimposed arrangement of different layers of elements, i.e. in angles ranging from 1 to 89° with respect to each other. Under such angles it is no longer possible for cutting elements to cut through the yarn ends under an angle of 90°. This improves stiffness of the fabric and thus also cutting resistance.

Bourgois teaches nothing concerning the use of any type of non-woven material in its composite. Bourgois only refers to the use of a woven fabric in textile materials and does not provide any hint that a non woven material may provide improved cutting resistance as well. In fact, as explained above, a non-woven material will be considered by a skilled person as a relatively 'weak' type of fabric and the skilled man would not be prompted to use such type of fabric for improving cutting resistance.

In addition, Bourgois does not provide any teaching for the positioning of layers of individual elements *within* a fabric under angles comprised between 1 and 89°. Bourgois only discloses the orientation of superimposed layers within a fabric under an angle of 90° (see e.g. FIG. 5-7 and 10), and provides no hints to a person of skill in the art that another orientation of the layers within a fabric would be highly preferred and more appropriate. Although Bourgois discloses that woven *fabrics* may be superimposed onto each other under angles of 60° to form a composite, such disclosure does not provide any teaching of suitable angles of orientation for *layers of individual elements* within fabrics.

In this respect, Lyons similarly does not teach the positioning of the layers of elements within a single fabric. Lyons teaches the superimposing of different woven fabrics onto each other under angles of 20-70°. However, the fabrics in Lyons are woven fabrics, and Lyons remains silent on suitable angles of orientation for layers of fibers within such fabrics. In view of the above, it is therefore submitted that even when the teachings of Bourgeois and Lyons would be combined, it would not be possible to arrive at the present composition, especially in view of the different type of fabrics (non woven in the present invention) and woven (in Bourgois and Lyons) applied.

In addition, by providing an insulating layer between the fabric and the matrix, the present invention provides a composite wherein the fabric is insulated from the matrix, i.e. spatially separated from the matrix, such that the matrix does not penetrate into the reinforcement elements. Since the fabric is a *laid* fabric which can easily fall apart, the insulating layer is very useful for keeping the fabric together and for fixing the fabric to the matrix.

The application of an intermediate insulating layer further has several other advantages. In first instance, the fabric has one additional degree of freedom, is able to move independently from the matrix and is therefore more flexible. Furthermore, since the fabric is either not connected, or at most only partly connected, to the matrix, the individual elements in the fabric, e.g. yarns, fibers, etc.., are free to move, independently from the matrix, when a cutting element is brought into the fabric. This ability of the individual elements in the fabric to undergo movements and displacements independently of the matrix will considerably improve the cutting resistance of the fabric and thus also the cutting resistance of the composite. It allows the individual elements to act as a set of elements, and not as individual elements, which could easily be cut through.

Bourgois remains totally silent on the need of having an insulating layer in between the textile (composite) and the fabric. The layer of synthetic threads provided in Bourgois can not be considered as an insulating layer as such, because it is not providing sufficient spatial separation between the matrix and the fabric, and because such synthetic threads are not suitable for keeping a (laid) fabric together and fixing such fabric to a matrix.

In conclusion, the cited documents, even in combination, do not provide any hint or teaching for the use of the recited particular type of cut-resistant fabric, as explained above, in combination with a particular type of insulating layer in a composite. Moreover, none of the cited documents points to the application of a non-woven fabric in which the reinforcement elements are not interwoven but indirectly connected. In view thereof, a *prima facie* showing of obviousness has not been made, and the rejection should be withdrawn.

CONCLUSION

In view of the above, it is submitted that the claims are in condition for allowance. Reconsideration and withdrawal of all outstanding rejections are respectfully requested. Allowance of the claims at an early date is solicited. If any points remain that can be resolved by

telephone, the Examiner is invited to contact the undersigned at the below-given telephone number.

Respectfully submitted,

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